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AUTHOR Beck, Isabel L.; And Others
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ABSTRACT

This report presents the rationale and design of a vocabulary program created as the instrument for research exploring the relationship between vocabulary knowledge and reading comprehension. The first section of the report reviews the current state of the art of vocabulary instruction and discusses the techniques used in two commercial basal reading series to teach vocabulary. The second section presents the rationale and theoretical positions underlying the experimental vocabulary program, while the third section details the structure of the program and presents examples of the types of instruction used in it. The final section briefly outlines the results produced by using the program in one fourth grade classroom. (FL)

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THE RATIONALE AND DESIGN OF A PROGRAM TO TEACH VOCABULARY TO FOURTH-GRADE STUDENTS

Isabel L. Beck, Ellen S. McCaslin, and Margaret G. McKeown

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University of Pittsburgh

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Abstract

This paper presents the rationale and design of a vocabulary program created as the instrumentation for research exploring the relationship between vocabulary and reading comprehension. The vocabulary instruction available in current basal reading programs and its inadequacies are first discussed. Then the rationale and design of our vocabulary program are presented. The instruction created to embody these notions is described. Finally, results showing the success of the first year of the program's implementation are discussed.

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Introduction

The trend in test scores of elementary grade children over the past several years shows that reading scores are on the rise for primary grades, but they exhibit a drop around the fourth or fifth grade level. (See for example the publication of test scores for the Pittsburgh Public Schools elementary population in the Pittsburgh Press, Marcus, 1980). This falling off of test scores is characterized as a deficiency in reading comprehension. But reading comprehension is not a unitary process. Rather, it is a complex process comprised of a number of interacting sub-processes. And, reading comprehension is not a single ability. Rather it is highly dependent upon, at least, the reader's decoding accuracy, decoding fluency, vocabulary knowledge, and previous background with the material in a given text. It would seem to follow, then, that attempts to alleviate comprehension problems are more likely to be productive if consideration is given to the components of the process and the abilities and knowledge required to perform those processes

and the instructional procedures used to teach the abilities and knowledge.

In an attempt to identify instructional dimensions that may affect the development of reading comprehension, we recently completed an analysis of two major commercial reading programs (Beck, McKeown, McCaslin, & Burkes, 1979). One of the dimensions identified and studied was vocabulary instruction, which we consider to be a potentially important factor in reading comprehension. While it seems obvious that vocabulary knowledge must be vital for reading comprehension, the precise nature of the relationship between the two remains unspecified. Through a program of ongoing research, we hope to contribute to reading theory and reading practice by understanding this relationship better.

As the instrumentation for our research, we have developed an extensive instructional program to teach vocabulary to fourth-graders. The purpose of this paper is limited to a description of the rationale and design of the instructional program. Forthcoming papers will concern themselves with what we have learned about the nature of the relationship of vocabulary knowledge to reading comprehension.

This paper is divided into four sections. Section 1 deals with the current state of the art of vocabulary instruction; it illustrates how vocabulary is currently taught in the two commercial reading programs that we studied. Section 2 presents the rationale and theoretical positions that underlie our vocabulary program. Section 3 details the structure of the program, and conveys the flavor of the program by presenting examples of the instruction and

discussing its characteristics. The fourth, and final, section briefly presents some instructional specific results from the use of the program in one fourth-grade classroom during the 1979-80 school year.

Section 1: The State of the Art

It is intuitively obvious that vocabulary knowledge is critical for reading comprehension. If children are to mature in their comprehension ability, it is essential that they expand their vocabularies. Indeed, intermediate grades' reading programs consider vocabulary development as part of their responsibility in that they have traditionally included the development of word knowledge as one of their goals. But how, specifically, do they go about accomplishing this goal and are their means as effective as they might be in enhancing word knowledge?

This question was addressed through an extensive analysis of the vocabulary development instructional strategies in the two basal reading programs whose comprehension instruction we examined (Beck, et al, 1979). Basal reading programs are organized around stories that students read and then discuss under teacher supervision. In the intermediate grades, the stories are often taken from independently published works and then are sequenced into basals on the basis of readability analyses. Readability analysis is accomplished by the application of readability formulas that take into account sentence length and vocabulary difficulty. After readability formulas have been applied to the selections and they have been ordered along a

first through sixth grade continuum, the program developers note in the teacher's manuals a subset of words that they believe may cause pronunciation or meaning difficulty for children. By the third or fourth grade most of the words noted in the teacher's manuals are of the meaning difficulty variety as by that time programs assume competent decoding. These words, which basically are selected on an intuitive basis, become the "target words" for vocabulary development activities. Traditionally, the development of word meaning is attended to through instructional events that occur prior to reading a selection, during reading, and after reading. In the sections that follow we will summarize briefly the vocabulary instruction found at each of these points in the lesson.

Prior to Reading

In most intermediate reading programs, the developers provide specific instructional strategies for dealing with the meaning of target words in the upcoming text. One of the programs we studied is very atypical in this regard as no such strategies are detailed. There is simply a general suggestion in the teacher's manual that the teacher may want to pre-introduce target words by writing them on the board and using them in strong oral context. In contrast, the other program we studied does reflect the traditional tendency to pre-teach at least a subset of the target words. In most cases of pre-reading instruction in this program, the target words are presented in sentences constructed with the aim of providing enough context to allow the students to infer the meaning of the target word. The

sentences are written on the board and children read the sentences and identify the words that explain the meaning of a target word. For example, for the target word profile, the following sentence is presented: "Although I could see only half of Angela's face as she looked away from me, I could tell from this profile view that she was quite upset." (Ginn, "Tell Me How the Sun Rose," Teacher's Manual, p. 55). Students are then asked to give a meaning for the word profile and to tell what clues were found in the sentence that suggested the word's meaning. While we did not specifically analyze each of the hundreds of pre-story sentences provided by this program, our sense is that many are adequate in conveying the target word's meaning.

During Reading

In both programs, the main vehicle of vocabulary instruction is the reading selection itself. Children are expected to learn new words by inferring their meanings from the text. But the texts children are using have not been specifically constructed to provide the context necessary for conveying the meaning of target words. Rather, they are texts written by professional writers whose concern is the communication of ideas rather than the specific demonstration of the meanings of particular words. Since the texts are not constructed specifically to establish the meanings of target words,

it seems that the extent to which a context is likely to lead a reader to the meaning of a target word depends on chance rather than on design.*

Both programs do include a glossary in the student's reader. Children are expected to refer to the glossary for meanings of unfamiliar words encountered in their reading selections. Unquestionably, knowing how to use a glossary is a highly valuable skill. But there is evidence that expecting children to look up unfamiliar words as they are encountered during reading is questionable as a major strategy for teaching word meaning. Children read selections beyond third grade independently; they are therefore on their own to identify and look up unfamiliar words. Studies have shown that children have difficulty isolating words whose meanings they do not know (Anderson & Kulhavy, 1972; Harris & Sipay, 1975), so many children may be unlikely to recognize even the need to use a reference. Even if they identify an unknown word, it seems that only highly motivated students will choose to interrupt their reading to check on its meaning. We have informally questioned teachers who report that they rarely see their students refer to the glossary.

The programs' reliance on story context and independent use of the glossary as methods of vocabulary development is at best

*We conducted a small study to see how helpful these contexts were. Two stories were selected from the basal readers, and the target words were blacked out. Adults were then asked to read the stories and determine the target words, or close synonyms. The adult readers were able to identify an average of only 51% of the target words (or synonyms) from context. We should point out that the target words were already in the vocabulary repertoires of our adult subjects which indicates that children unfamiliar with the words would be much less likely to get meaning from the contexts. We have developed a categorization scheme that predicts which words will be identified, but a discussion of that is not germane to this paper.

appropriate for the most motivated and competent readers. Children most in need of vocabulary development, less-skilled readers who are unlikely to add to their vocabulary from outside sources, will receive little benefit from such indirect opportunities.

After Reading

In the two programs, after-reading activities are presented which include a variety of "skills" development exercises. For vocabulary, they consist mostly of independently completed exercises. In one of the programs, after-reading activities in the vocabulary strand are oriented toward reinforcing target words. For each story lesson, exercises are provided after reading for the same set of target words found in the story. These activities provide one more encounter with the words, which then do not reappear on any regular basis in later reading selections. In the other program studied, the same program that detailed no vocabulary pre-teaching strategies, after-reading vocabulary activities introduce an entirely new set of words. No effort is made to provide experience with the target words introduced in the stories.

The Best and the Worst in Juxtaposition

Let us now for a moment consider the best case of vocabulary instruction that can occur as students are exposed to new vocabulary in the better (for teaching vocabulary) of the two programs we studied. A new vocabulary word is presented in a sentence that elucidates the meaning of the new word; the word is encountered in

the text selection and the student looks it up in the glossary if s/he does not remember its meaning; the word appears a third time in an independently-completed, after-reading activity. Remember, this is the best instance of new word experience that we encountered in the two basal programs. It does not necessarily occur with any regularity.

At worst, a new word appears solely in a selection and the student skips over it because s/he either does not recognize it as an unknown word or does not want to be bothered with the disruptive glossary step.

Clearly, there is a big difference between these instances in the chances that a new word will be learned. However, we believe that even in the best case presented, it is likely that a new word has not had enough exposure for its meaning to be readily accessed even a short time after the instruction. Indeed, it is our assertion that it takes an extended series of fairly intense exposures before one "owns" a word, that is, before it can be quickly accessed and applied in appropriate contexts. This is particularly so since words introduced at this level are not of the type heard in everyday conversation, and thus not so easily reinforced. Therefore, we believe that neither the frequency conditions nor the instructional strategies in intermediate grades reading programs are as effective as needed for enhancing word knowledge.

In the next section of this paper, we present the rationale and theoretical positions underlying the design of our vocabulary program. As will become evident, one of the most salient of these positions is

the recognition of the necessity for varied practice and repetition of new vocabulary words within the instructional setting.

Section 2: Rationale and Theoretical Positions

Our primary aim in developing a vocabulary program was not to create a program that teaches a specific set of vocabulary words. Rather, the program was to be a vehicle through which we could explore two major purposes. One purpose was to attempt to develop in the students a heightened word consciousness. Our notion here was that deep and fluent expertise on a limited set of words might arouse a general interest, leading children to be more aware of words in the speech and print around them. This in turn might motivate children to use their environment to learn more new words. Our other purpose in creating the vocabulary program was to arrange conditions that would allow us to study the effects of vocabulary knowledge on reading comprehension.

A full discussion of what we have learned in regard to these two purposes is beyond the scope of this paper. They are mentioned here because much of the rationale for program development is based on our notions about word consciousness and about the relationship between vocabulary knowledge and reading comprehension.

Vocabulary Development and Reading Comprehension

Experimental evidence from work that has attempted to explore the relationship of vocabulary instruction to reading comprehension is less than clear. Draper and Moeller (1971) reported the results of the year-long St. Louis Vocabulary Development intervention in which increases in vocabulary knowledge also brought about increases in reading comprehension for intermediate grades students on the Iowa Tests of Basic Skills.

In another series of experiments, however, vocabulary training through direct instruction resulted in more word meanings being acquired but showed significant differences on only one of three measures of comprehension of specifically constructed textual passages (Jenkins, Pany, & Schreck, 1978). Jenkins et al concluded that one explanation for the disappointing reading comprehension results may have been that "perhaps the presumed importance of vocabulary knowledge has been somewhat over-estimated. It may be that readers can tolerate an unexpectedly high proportion of unfamiliar words without suffering comprehension losses" (p. 29). However, Jenkins et al also offered another possible explanation for the lack of comprehension improvement. They suggested that "possibly, the increased task demands involved in comprehending connected discourse require greater vocabulary facility than that produced in the instructional procedures employed in the present study" (p. 29). Jenkins et al went on to explain that their training procedure may not have developed the rapid lexical access required for assisting the comprehension of connected discourse.

The latter hypothesis suggested by Jenkins and his colleagues fits with a current view of reading that has been a primary force in our own thinking on vocabulary development. Current information processing models of reading view reading as an activity comprising a number of subprocesses. Since human processing capacity is limited, too much attention devoted to one subprocess may restrict the working of other subprocesses. This situation requires that some component processes of reading proceed virtually automatically in order for skilled reading to take place.

Most of the research done in relation to the automaticity notion has revolved around simple word recognition. Work by LaBerge and Samuels (1974), Perfetti (1977), and Perfetti and Hogaboam (1975) has demonstrated that good comprehenders exhibit rapid word recognition, while poor comprehenders, although accurate at word recognition, are significantly slower. The body of automaticity theory and research suggests to us that rapid access of word meaning may also be related to good reading comprehension. Indeed, in our vocabulary program we are not only concerned with adding words to the child's vocabulary store but promoting rapid lexical access of those words.

Levels of Word Knowledge

Simply being able to recognize the meaning of a word does not imply rapid lexical access of that meaning during reading. This view has led us to distinguish three general levels of word knowledge. A discussion of these levels and their effects on comprehension should serve to illustrate the role of rapid lexical access. The levels of

word knowledge we have distinguished are the established level, the acquainted level, and the unknown level.

A word at the established level is one whose meaning is easily and rapidly (perhaps automatically) accessed. A word at the acquainted level is one whose meaning is recognized, but only after deliberate attention has been focused on it. A word at the unknown level is one whose meaning has not been established in semantic memory. A hypothetical example may serve to distinguish between the acquainted and established levels. In reading about "a ferocious lion," a fourth-grader might pause momentarily to search his/her lexicon before associating ferocious with its meaning; in this case, ferocious would be at the acquainted level. The same child would most likely have immediate understanding of the word lion, a word likely to be at the established level in most fourth graders' vocabularies.

In terms of the relationship between levels of word meaning and comprehension, it is obvious that the best situation for comprehension of a text would occur when virtually all of the words in a given text are in the established repertoire of the students reading the text. If this were the case, processing could be directed toward the meaning of a sentence, a passage, or a discourse; it would not have to be interrupted for individual word searches. By contrast, if a text contains too many words at the unknown or acquainted levels, comprehension of the textual message may be restricted. Unknown words can create gaps in the meaning of a text; if too many gaps occur, the student may not be able to construct meaning. While words at the acquainted level may not cut into the meaning of a text, they do

interfere with the processing of the text, since attention must be diverted from constructing meaning of the discourse to search for the words' meanings. If processing is frequently interrupted for such searches, it may be slowed to the extent that comprehension suffers. Indeed, as Lesgold and Perfetti (1978) have asserted, "In the non-ideal world of everyday reading, that which takes a long time to do may not get done" (p. 332).

But just how many instructionally-varied opportunities and repetitions are needed before the meaning of a target word becomes easily and rapidly accessed? That question, important in its relationship to reading comprehension, is one that we are addressing through our vocabulary program. We have designed two different frequency situations within the instruction to find out whether differential exposure to a target word produces differential lexical access. In the first frequency situation, which we call the some condition, eight to ten new words are taught and reinforced through vocabulary lessons of twenty minutes to half an hour daily for five days. In the second frequency situation, termed the many condition, a subset of words from the some condition is maintained over time. The many words reappear in the instruction of new words in subsequent weeks and are also treated in specially-designed review cycles. In this manner, the words in the many subset appear 16-22 additional times each. The operation of these two frequency conditions within the instruction will be discussed in later sections. We now turn to a discussion of the selection of the instructional words.

Selecting the Words for Instructional Treatment

Our starting point for selecting words for the vocabulary program was the fourth-grade material of the Ginn Reading 720 Series. From Ginn's target vocabulary, we selected words that we judged would likely be unknown, yet useful and interesting for fourth-graders. Since our plan of instruction involved presenting sets of words grouped around some semantic similarity, we sorted the words to derive category groupings. This sorting left us with a smaller word pool, because not all words fell into the categories created. Additional words were then chosen for the categories from sources such as the Dale and Eichholz (1960) word lists. From these word groupings we developed 12 five-day cycles of instruction, encompassing a total of 104 words. A subset of 43 words was chosen from the instructional pool to be maintained over time in the instructional setting -- the *many* words.*

To provide the reader with a sense of the difficulty level of the target words and their loose organization around a semantic category, Table 1 lists all of the words that were selected for instruction for each of the 12 five-day cycles. Words designated with an asterisk are those selected for the *many* condition, i.e., those words practiced an additional 16-22 times outside of the original five-day cycle.

We move now to a discussion of the notions that influenced the design of instructional strategies used in the program.

*Our research design also called for an additional set of 43 words to be selected to correspond to pairs of *some* and *many* words in difficulty, semantic similarity, and length. These words, designated as *none* words, did not appear in the instruction, but solely on pre and post program measures.

Table 1

Words Selected for Vocabulary Instruction by Cycle

Cycle	Semantic Category	Words Taught
1	People	accomplice*, virtuoso*, rival, philanthropist, novice*, hermit*, tyrant*, miser
2	What You Can Do With Your Arms	beckon*, embrace*, knead, flex*, hurl, seize*, nudge, filch, thrust*
3	Eating	obese*, glutton, devour*, appetite*, fast*, wholesome, nutrition, famished, edible*
4	Eyes	gape, spectator*, binoculars, squint, focus*, scrutinize*, glimpse*, inspector
5	Moods	cautious*, jovial, glum*, placid*, indignant, enthusiastic, diligent, envious, impatient*
6	How We Move Our Legs	stalk*, galumph, vault*, trudge*, patrol, meander*, strut, lurch, dash
7	Speaking	wail, chorus, proclaim, mention, banter*, commend*, berate*, urge*, retort
8	What People Can Be Like	frank*, gregarious*, independent, ambitious*, impish, obstinate, vain, generous, stern
9	Ears	eavesdrop*, rustle, audible, din, volume, melodious, serenade, shrill*, commotion*
10	More People	acquaintance*, journalist*, introvert*, scholar, prophet, merchant, scapegoat, ancestors, extrovert
11	Working Together or Apart	feud, ally*, foe, conspire, diplomat, compromise, pact*, harmony*
12	The Usual and the Unusual	typical, monotonous, obvious, habitual, unique, exotic, extraordinary, peculiar

Instructional Methods

It was our intent to include a variety of instructional strategies within our program because, in our judgment, asking students to manipulate words in many various ways should result in greater understanding of the words and more flexibility in using the words. The pattern of traditional instruction in vocabulary is that a definition and/or a sentence using the target word is presented or elicited from students. This is often followed by a brief discussion of the word's meaning. We have retained these traditional techniques, but have also included instructional strategies beyond those of defining and generating sentences.

One technique we drew upon was that of concept learning. Carroll (1964) first described vocabulary development as a form of concept learning. Anderson and Kulhavy (1972), Klausmeier, Ghatala, and Frayer (1974), and Markle (1975) have all suggested that concept-learning techniques facilitate vocabulary development. Instruction designated as concept learning is characterized by the presentation of examples contrasted with non-examples of a concept being introduced, and by classification exercises. These activities require that the student distinguish the critical attributes of a word's meaning.

Target vocabulary words can also be taught in terms of the relationships they share with other words. In process models for long-term memory (see for example Rumelhart, Lindsay, & Norman, 1972), networks of concepts are interconnected by relations. Meanings are established through the relations that hold among various concepts.

The instructional implication is that target words can be presented and practiced in ways that take advantage of their semantic relationships. In our program, exercises have been designed that ask students to recognize relationships between words as a way of expanding understanding of the words.

The automaticity notion, which heavily influenced the design of our program in a general way, also influenced decisions on specific instructional strategies. As a way of promoting rapid lexical access, activities have been created that require students to respond to word meaning under speeded or timed conditions.

Characteristics of Instructional Design

In discussing our rationale for decisions on word selection and instructional methods, we have mentioned several characteristics of the instructional design. The characteristics introduced so far were: that a variety of instructional strategies be used; that opportunities be provided for practice and repetition of the target words; and that speeded and timed training conditions be used in instruction to help foster automaticity of lexical access. Several other design characteristics embodied in the program are as follows:

1. That the instructional activities be varied within a regular pattern to enable students to anticipate the general type of vocabulary work as a cycle progresses from day to day while experiencing enough diversity to maintain interest.

2. That there be a built-in testing procedure to determine the extent of students' mastery of the target words.

3. That the instruction have activities and materials engaging enough to involve even the more reluctant learners.

4. That the teacher guidelines be explicit enough to follow with

relatively little advance preparation.

5. That there be an ongoing written record kept by each student of words being learned.

6. That the instruction attempt to stimulate the use of the target words outside of vocabulary class as well as in.

The next section of this paper demonstrates the operation of these characteristics within the program.

Section 3: The Pattern of Instruction

In this section we present the pattern of instruction for the five-day cycle and the review cycle. Specifics of the five-day cycle will be explored through a description of the instructional activities within a particular cycle, the People cycle.

The Five-Day Cycle

As mentioned previously, each set of eight to ten new words is introduced and worked with for approximately half an hour daily for five days. During each five-day cycle, the words are introduced, practiced in varied and motivating ways, and then tested to determine the extent of their mastery after this relatively intense instructional treatment. The instruction is presented via teacher-led, whole class activities. There are numerous independent and small group activities, but for the most part, the class works on the same activity at the same time. A detailed plan which specifies the instructional strategies and procedures for each activity for each day's lesson is presented in a teacher's manual.

The student activities are varied; they include activities such

as defining tasks, sentence generation tasks, classification tasks, oral production tasks, game-like tasks that must be completed under timed conditions, and tasks that take advantage of the semantic or affective relationship among the target words and previously acquired vocabulary. On any given day of the cycle, however, students have a general sense of what will be happening that day because the instruction has been designed according to a pattern. Figure 1 presents the pattern of instruction for the five-day cycle. The activities that are boxed always take place on the specified day of the cycle. The circles indicate a range of activities, one of which would take place on the specified day during each cycle.

Day 1

Let us now take a look at what Day 1 is like in the People cycle. The words, representing different kinds of people, taught in this cycle are: accomplice, virtuoso, philanthropist, novice, hermit, tyrant, rival, and miser. Day 1 begins with students receiving their logsheets, which are presented here as Figure 2. The four words shown on the left side of Figure 2 are presented at one time. First, the teacher reads accomplice, has the students pronounce the word after him/her, reads the definition of the word, and has the students write accomplice on the blank line next to the word on the logsheet. The same steps are then followed for virtuoso, philanthropist, and novice. Then, in order to involve the children actively with the new words, the teacher conducts a quick semantic word association activity with the four new words. The teacher says a word or phrase and students

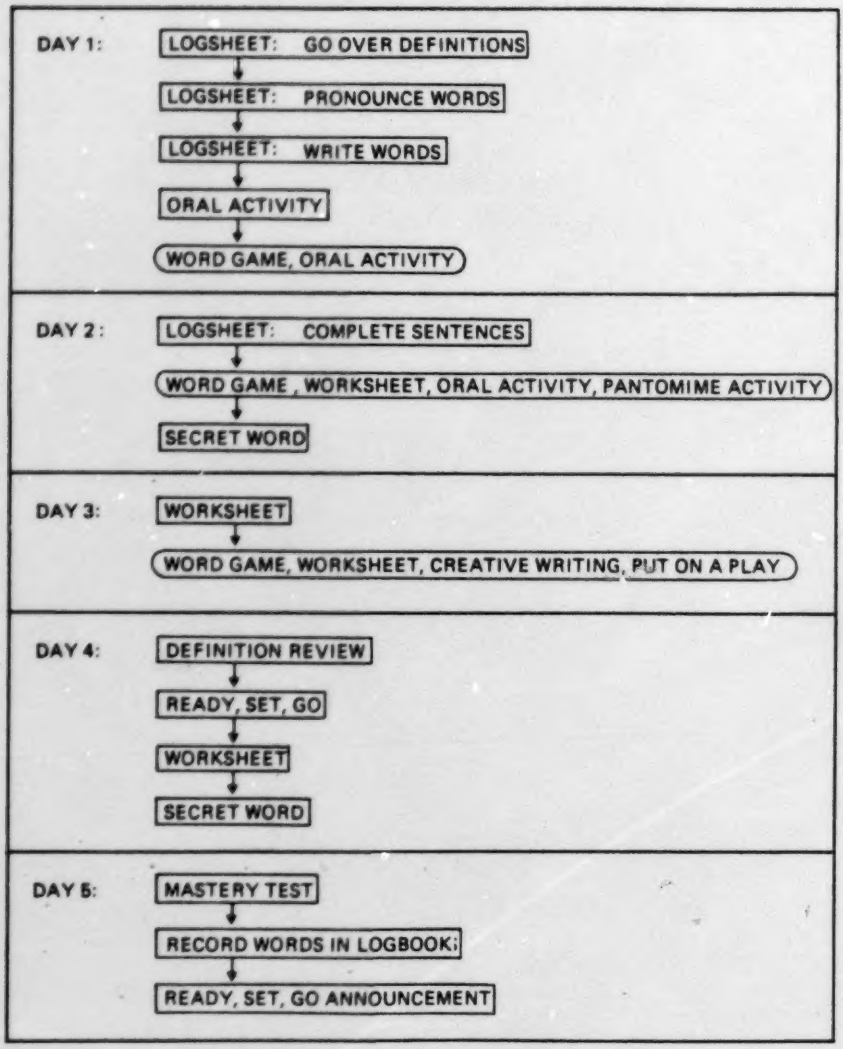

Figure 1. Pattern of instruction of the five-day cycle.

Log Sheet - People

1. accomplice _____: a person who helps someone else commit a crime.
The accomplice swore he would never break the law again because

2. virtuoso _____: a person who is excellent at playing music. The audience asked the virtuoso to play another piece of music because

3. philanthropist _____: a person who tries to help other people, often by giving a lot of his time or money. The Pittsburgh Press called Mr. Smith a philanthropist because

4. novice _____: a person who is a beginner at what he is doing. The skiing teacher said Jack was a novice on the ski slopes because

5. hermit _____: a person who goes away from other people and lives by himself.
A hermit built a hut deep in the woods because

6. tyrant _____: a person who rules other people in a cruel and unfair way.
A tyrant is not loved by people because

7. rival _____: a person who tries to do at least as well or better than someone else.
Jim is my rival because

8. miser _____: a person who lives as if he is very poor in order to save money and hide it away. A bag of gold was found in the miser's house because

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Figure 2: Logsheets from Day 1 of People cycle

search their logsheets to find one of the new words that goes with what the teacher said. For example, when the teacher says "crook," students are to respond with accomplice. The other associations for the remaining three words are: "gift to build a new hospital" (philanthropist), "piano" (virtuoso), and "kindergartner" (novice). For each answer given, students are asked to justify why the word they identified goes with the word or phrase said by the teacher.

An activity then follows, called "Yays or Boos," that taps affective associations students are likely to have about the four words just presented. In this exercise, the teacher says each new word and students respond by "yaying" if they feel positively about a person represented by the word or "booing" if they feel negatively. For example, when the teacher says accomplice, students likely "boo." However, contra- indicated responses are always accepted as long as students can justify their reasons. Indeed, throughout the program we continually alert the teacher to elicit justifications for answers given, and to accept any reasonable answer, though it may vary from those suggested, as long as the student can present a good reason for the response.

The remaining four words of this cycle, shown on the right side in Figure 2, are presented in an identical manner: the teacher goes over the definitions of the words with the students, including having them pronounce and write each target word; conducts the semantic word association activity; and then leads the affective "Yays or Boos" activity. Since the word presentation is identical to that of the first four words, it is necessary here only to note the clues provided

by the teacher for the semantic word association activity. They are "whip" (tyrant), "alone" (hermit), "cash tucked away in a shoebox" (miser), and "challenger for the heavyweight boxing crown" (rival).

At the end of this day's instruction, the students store their logsheets in their logbooks, which are loose leaf notebooks provided for keeping a cumulative record of the instructional words. And the teacher then reminds them about how they can accumulate points to be recorded on the "Word Wizard Chart." The Word Wizard Chart is a motivational gimmick designed to encourage children to be attuned to the target words outside of vocabulary class. The children can earn points by reporting about hearing the words in conversation, seeing them in print, or by using them in speech and written work.

Let us stop a moment and consider what the student has done with the eight new words on this first day of instruction. S/he has pronounced the word after hearing the teacher say it, has heard the definition read, and has written the word him/herself. Then s/he has supplied the target word as a response to a semantically related stimulus and has made an affective response to the target word as a stimulus. Already, the student has had several varied experiences with the words.

Although Day 1 of each cycle always includes the presentation of definitions on the logsheet, followed by an oral activity, there is variation among the cycles in the way these two activities are presented. For example, for the definition presentation portion of the People week, the definitions appeared on the logsheet and were read to the students. In other cycles only part of the definition may

appear on the logsheet with students required to extract the remainder from clues contained in a story or pictures. The oral activity, as well, appears in various forms, but always aims to get the children quickly involved in manipulating the new words and their meanings.

Day 2

On the second day of the People cycle, after a very brief review of the definitions, the children complete the sentence fragments (shown in cursive writing) on the logsheets in Figure 2. On the logsheets for the People cycle, each sentence fragment already uses one of the target words (e.g., The accomplice swore he would never break the law again because ...). The teacher guides students to complete the sentences in a manner that shows they know the meaning of the target words. When a good ending has been elicited, the children write the ending on their logsheets to complete the sentence. After endings are established and written for each of the eight words, the class is divided into several teams to play a game which requires matching each new word with a good definition. Both accuracy and speed are required "to win." It is useful to note that the requirements of accuracy and speed serve as a preview to an activity that will take place on the fourth day of this, and every, five-day cycle; this is the "Ready, Set, Go" activity. At the conclusion of this second day's instruction, the teacher alerts the students that an unspecified target word will be "the Secret Word of the day." Students try to identify and use that word in an oral sentence sometime during the school day outside of vocabulary class. For identifying and using

the "Secret Word," students earn points to help them become "Word Wizards."

Again, for Day 2, there is variation within regularity throughout the cycles. While in the People week, students were required to complete a sentence stem which contained the target word, other cycles may call for the students to generate the part of the sentence containing the target word, or for students to unscramble a sentence ending and write it on the logsheets.

The day's other activity may also take a variety of forms such as a game, oral activity, or worksheet. The intention of this activity is always to provide fairly easy practice with the word meanings, since students are still in the early stages of meaning acquisition, according to our view. These activities are also designed to be fast-paced and lively, as a change of pace from the earlier more pedagogical writing exercise. Day 2 always ends with a "Secret Word."

Day 3

On the third day of People instruction, students complete the worksheet shown in Figure 3. This worksheet attempts to establish a relationship between the eight new People words and behaviors that would be appropriate for those people. For each target word, students first select an answer from three multiple choice possibilities that identify different actions people might make. One of the actions is particularly appropriate for a person exemplified by the target word. For example, in Number 1, would an accomplice be more likely to: a) squeal to the police in return for not having to go to jail? b) rob a

People Behavior Worksheet

1. Which one of these things would an accomplice be likely to do?

   a. squeal to the police in return for not having to go to jail

   b. rob a bank by himself

   c. enjoy babysitting

Write one more thing here that an accomplice might do: _____

_____

2. Which one of these things would a virtuoso be likely to do?

   a. forget the notes to the music she is playing

   b. play so well that the audience bursts into applause

   c. wear clothes that don't match

Write one more thing here that a virtuoso might do: _____

_____

3. Which one of these things would a hermit be likely to do?

   a. invite company to dinner

   b. carry a briefcase to work

   c. not answer the door if somebody knocks

Write one more thing here that a hermit might do: _____

_____

4. Which one of these things would a novice be likely to do?

   a. tell other people how to do a job

   b. watch how an expert does the job

   c. drive a race car in the Indianapolis 500

Write one more thing here that a novice might do: _____

_____

5. Which one of these things would a rival be likely to do?

   a. watch television the night before a big test

   b. sleep in late in the morning

   c. study hard to get the best mark on a test

Write one more thing here that a rival might do: _____

_____

6. Which one of these things would a philanthropist be likely to do?

   a. turn the heat off in an apartment building he owns

   b. enjoy talking on the telephone

   c. take a job that helps people but doesn't pay any money

Write one more thing here that a philanthropist might do: ___

_____

7. Which one of these things would a miser be likely to do?

   a. grow a mustache

   b. spend money for a cruise around the world

   c. take out all his money and count it every night

Write one more thing here that a miser might do: _____

_____

8. Which one of these things would a tyrant be likely to do?

   a. give people extra vacation time

   b. order children to go to school on Christmas Day

   c. take children to the zoo

Write one more thing here that a tyrant might do: _____

_____

Figure 3: Worksheet from Day 3 of People cycle

bank by himself? c) enjoy babysitting? Obviously in this case, a) is the response to be circled by the students. For each target word, students are then asked to think of and write in a different action that the same person might also be likely to make (e.g., for accomplice, "drive a get-away car"). Items 1 and 2 are completed through a group discussion, while items 3-8 are done independently, with the answers shared immediately afterwards as a group activity. Once again, students are asked to justify their responses by explaining why they answered the way they did.

While students are completing the independent part of the worksheet, the manual suggests that the teacher can use that time to mark the "Word Wizard Chart" for those students who show that they have earned points by seeing, hearing, or using the new words outside of vocabulary class. This point is noted as an example of our consideration for classroom management. Here we attempted to arrange conditions that would allow the teacher to implement the Word Wizard Chart without consuming excess classroom time. Indeed, throughout the design of the program we were very sensitive to classroom management issues because of a view that manageability of a program is closely tied to its success in a classroom.

The assorted activities that appear on Day 3 throughout the program tend to be of a more creative variety than those of the earlier days. The children may be asked to do some creative writing, to put on a skit, or some other activity that requires them to generate contexts or situations around the target words.

In the cycles that follow People, Day 3 activities include the

many words from previous weeks, those that have been selected to receive extended practice. This is not the case here since People is the first cycle of the program; no many words have yet accumulated.

Day 4

The activities on the fourth day of the cycle always proceed according to the following pattern: there is a brief oral definition review activity and then an exercise called "Ready, Set, Go." "Ready, Set, Go" aims to develop speed in matching the target words and their definitions. Students work in pairs for this activity; one student operates a stopwatch while the other draws lines from each target word to its definition on the "Ready, Set, Go" worksheet. (The use of a stopwatch has been practiced extensively in an introductory lesson to the vocabulary program.) Then the students switch roles and the other student times while the first student matches words to definitions. Each student completes four such rounds of line-drawing from word to definition, with the words and their definitions being presented in four different orders. Students are encouraged to try to better their previous time while maintaining accuracy. One page of the student's "Ready, Set, Go" packet is presented as Figure 4. Completion time is recorded in the designated place on each sheet and extra penalty seconds are assigned later for incorrect answers.

The activity that follows Ready, Set, Go on each Day 4 generally attempts to present some challenge to the students by motivating them to think about the words in a new way. For the People cycle this activity, shown in Figure 5, probes overlap among the words.

Lap 1

1.	rival	new at what he is doing
2.	hermit	mean and cruel
3.	novice	helps commit a crime
4.	virtuoso	gives time or money to help others
5.	accomplice	stays away from other people
6.	miser	tries to do better than someone else
7.	tyrant	tries to save all his money
8.	philanthropist	plays music beautifully

Time it took to finish:

_____ minutes

_____ seconds

☐ penalty box

Figure 4: One page of Ready, Set, Go from People cycle

People Pairing Worksheet

Directions: Answer each question yes or no.

1. Could a virtuoso be a rival? _____

2. Could a philanthropist be a miser? _____

3. Could a virtuoso be a novice? _____

4. Could an accomplice be a novice? _____

5. Would a hermit likely be an accomplice? _____

6. Could a tyrant be a miser? _____

Figure 5: Worksheet from Day 4 of People cycle

Questions on the worksheet ask whether a person who is represented by one of the new words could also be represented by another new word, e.g., Could a virtuoso be a rival? Students are encouraged to explain why a person could or could not be represented by both labels. In some questions, e.g., Item 3, both answers are equally appropriate. A virtuoso would not be a novice in his or her musical field but could easily be a novice at some other activity. The notion here is that these kinds of questions enrich the understanding of each word by encouraging students to think of commonalities and differences among the words. Consideration of these kinds of questions is aimed at the understanding that words are not always mutually exclusive and at an awareness of nuances of meaning.

At the end of the exercise, students are alerted that there is a "Secret Word" of the day to be guessed and used in a sentence outside of vocabulary class.

Day 5

On the fifth day of the cycle the students take a multiple choice mastery test, shown as Figure 6, have it marked by fellow students, and then make an entry into their logbooks for each word they got correct. The correct definition used on the test is a paraphrase of the one contained on the logsheets on the first day of the cycle. For any words that were incorrectly identified on the test, there is an extra step. Students must generate a sentence using the word correctly before it can be entered into the logbook. On the fifth day of the cycle, the teacher also reports the results of the preceding

1. novice
   a. hard worker
   b. nice young girl
   c. beginner
   d. bike rider

2. rival
   a. someone who is very smart
   b. someone who talks too much
   c. someone who eats too much
   d. someone who wants to be in first place

3. virtuoso
   a. excellent music player
   b. student who gets good grades
   c. writer of funny music
   d. beginning tap dancer

4. miser
   a. bank teller
   b. greedy money saver
   c. baseball card trader
   d. department store clerk

5. tyrant
   a. mean ruler
   b. good doctor
   c. crying baby
   d. person who tells lies

6. philanthropist
   a. teacher of college students
   b. giver of harmful drugs
   c. inventor of new cars
   d. giver of money or time

7. accomplice
   a. fire fighter
   b. jail guard
   c. helper in a crime
   d. helper with housework

8. hermit
   a. president of a club
   b. unfriendly person who lives alone
   c. poor old woman
   d. person with no children

Figure 6: Mastery Test from *People* cycle

day's "Ready, Set, Go" activity by announcing the fastest time of a perfectly completed page for each student and moves the markers on the Word Wizard Chart.

Having explored the basic five-day instructional cycle through sample lessons for each day, we move to a discussion of the review cycles which provide additional practice for a subset of the words presented in the five-day cycles.

The Review Cycle

As previously mentioned, 43 words have been selected to receive additional review. Two or three day review cycles, presented to the children as "Oldies But Goodies," that also take approximately half an hour daily, have been interspersed between the conclusion of certain five-day cycles and the beginning of the next cycles to provide opportunities for the many words to be encountered over time. There are six "Oldies But Goodies" cycles. Figure 7 presents the placement of these review cycles in relation to the five-day initial presentation cycles.

The instruction within the review cycles has also been designed according to a pattern. As specified in Figure 8, the first day of each cycle, Day A, begins with "Can You Remember this Word?," a worksheet activity in which students guess words that are being described through a series of three clues. For example, the clues for tyrant are: 1) This person is someone you would hate to have as a teacher; 2) It's someone who is mean and cruel to other people; 3) The word has six letters and starts with a t. The students uncover

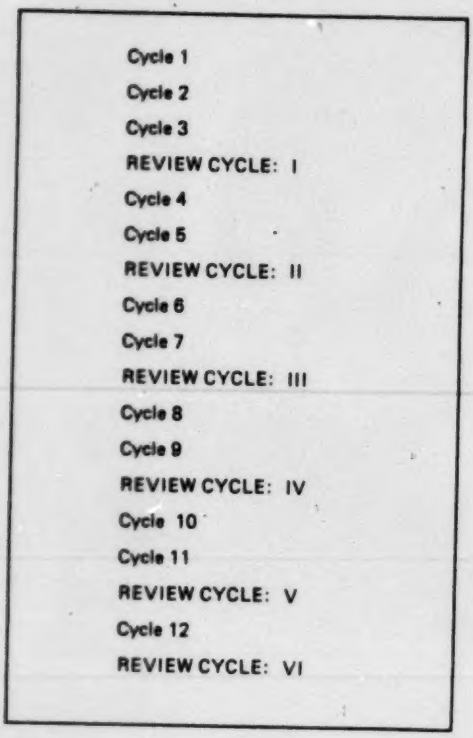

Figure 7. Placement of the six review cycles.

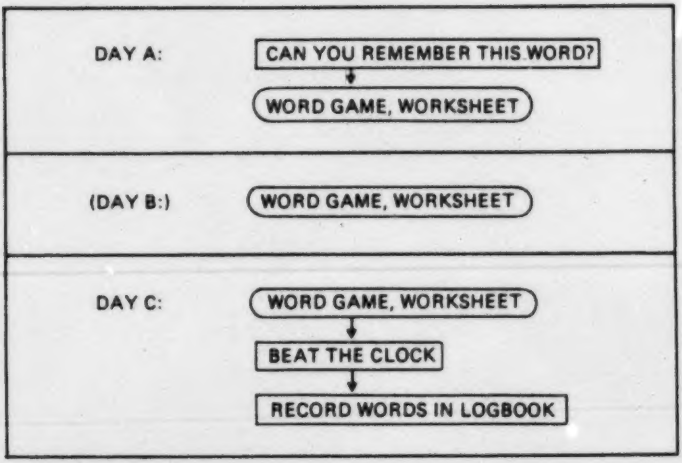

Figure 8. Pattern of instruction of the review cycle.

the clues one at a time, stopping as soon as they have identified the word.

For the remainder of the first day of the review, and the second day if it is a three-day review cycle, there are word games such as a Word Bee or Buzz and worksheets that capitalize on a word's category membership or semantic or affective relationships. There are also worksheets that can be completed independently such as crossword puzzles or scrambled word games. The two or three day review cycle always ends with a speeded testing activity called "Beat the Clock" in which students are given a set amount of time to answer as many true/false questions containing the review words as they can. (e.g., You take tiny bites when you devour something. True False) Because of the speeded condition, there is some pressure on the students to respond quickly as well as accurately. Target words from questions that have been answered correctly are again noted in the logbooks. Once again, a word must be used in a written sentence before it can be entered in the logbook if the question containing that word was incorrectly answered.

Now that we have described the pattern of instruction and given a glimpse of the instruction itself, we are ready to address the issue of how the program worked when placed in a classroom. In the final section we discuss the effects of the program.

Section 4: The Effects of the Program

The issues to be addressed here are the extent and usefulness of learning, and the attitude toward the program. The discussion will draw upon five sources: results of the pre- and post- multiple choice tests of vocabulary knowledge; a student questionnaire; items submitted by the children toward points on the Word Wizard Chart; the teacher's journal of daily lessons; and our own observations.

First we present some background information about the implementation of the program. During 1979-1980, the vocabulary program was used in one fourth-grade classroom in a small, urban public school district contiguous to the city of Pittsburgh. The school had two and one half fourth grades (one classroom was composed of third and fourth grade students). The program was implemented into one of the full fourth-grade classrooms and these children became the experimental subjects. The remaining fourth-grade students in the same school, who continued to use the language arts program previously in use, were used as comparisons.

Our multiple choice vocabulary test, composed of 63 *some* words, 43 *many* words, and 43 *none* words, was administered to all fourth graders in the school in September of 1979. The vocabulary program was inaugurated in the experimental classroom in early October and ran through mid-March, 1980. Post-program measures for all fourth graders in the school consisted of our vocabulary knowledge test, the Vocabulary and Reading Subtests of Form 8 of the Iowa Tests of Basic Skills (Hieronymus, Lindquist & Hoover, 1979) and several individually administered experimental tasks designed to investigate comprehension

at the word, sentence, and discourse levels. In addition, a questionnaire was administered to the experimental group. Results and implications from the Iowa Tests and the experimental tasks will not be discussed here since they are relevant to the relationships between vocabulary and reading comprehension rather than to instructional design, which is the focus of this paper.

Extent and Usefulness of Learning

The most obvious question to be asked about the program is did the children learn the words? A comparison of gains made on the vocabulary knowledge test shows quite clearly that the children did indeed learn what they were taught.

Table 2 presents the pre-post results by the many, some, and none categories of words.* While experimental and comparison groups did not differ reliably in the extent of knowledge of the words tested on the pretest, the experimental group showed great gains on the posttest. A three-way analysis of variance with testing point (pre- or post-program), word category (many, some, none), and condition (experimental or comparison) entered as factors yielded a reliable three-way interaction, $F(2,88) = 32.85$, $p < .001$. There are two very interesting points about this interaction. First, although the

*The data presented here are for 23 matched pairs of experimental and comparison subjects. The 23 matched pairs were created from the combined reading and vocabulary scores on the Iowa Tests of Basic Skills (Form 7) administered in September, 1979. There were three additional students in the experimental classroom for whom no match was found; two children in the experimental group obtained scores too low to allow a reasonable match to be made, while the other experimental student had been matched to a student who moved away from the school district before posttesting was completed. These three additional experimental students have been included in the questionnaire results which will be discussed shortly.

Table 2

Mean Percentage of Words Identified Correctly on the Multiple Choice Pre- and Post-Tests for Experimental and Comparison Groups

Group	N	Pretest			Posttest		
		Many Words	Some Words	None Words	Many Words	Some Words	None Words
Experimental	23	29.73	31.43	26.69	86.45	77.55	40.75
Comparison	23	27.50	28.58	29.93	34.48	33.71	31.65

experimental group's scores soared on both categories of instructional words (many and some), gains were greater on the many words (Newman-Keuls test, $p < .01$). This is evidence in the direction of our notion that a new word needs many exposures before it is "owned."

The second point of interest is that the experimental group also exhibited growth in knowledge of the none words, those words not met in instruction. Post-hoc analysis revealed that differences in post-test scores for the experimental and comparison groups were reliable for the none words as well as for the some and many words (Newman-Keuls test, $p < .01$). This result suggests some transfer from learning specific words to learning other equally difficult but non-related words. Here is a hint of a general heightening of the "word consciousness" that we had hoped to effect. Word consciousness is a major notion in our vocabulary work that will be discussed in a forthcoming paper and pursued in further research.

Other sources give further indications that learning took place. That some deep learning of the words was occurring was easily seen during observations of the experimental class. We were continually impressed with the children's growing facility with the words as each cycle progressed. For example, by the third or fourth day of the cycle children frequently gave their own spontaneous definitions for the words.

The questionnaire to which the children who received the program responded suggested that the children had strong perceptions that they were learning. To a question that asked how well they remembered the words they learned, 13 of the 26 children responded very well, and 13

responded pretty well; none responded only a short time or not at all.

The children tell their own story about the usefulness of the words. In response to a question about how often they saw or heard target vocabulary words outside of class, 16 children responded very often, 8 responded pretty often and 2 said only sometimes; no one responded never. The children also attested to using the words in speech and writing, although use was not as prevalent as hearing or seeing the words. Asked how often they used the words in talking to someone, 9 said very often, and 7 said pretty often, while 8 said only sometimes, and 2 said never. In response to a question about use of the words in writing situations, 8 children said they used the words very often, and 7 responded pretty often, while 5 said only sometimes and 6 said never.

Evidence of the usefulness of the words also comes from the great quantities of material and reports children submitted to the teacher to earn points on the Word Wizard Chart. In fact, the teacher was nearly overwhelmed by these items such that new schemes had to be worked out along the way to handle the management of the Word Wizard Chart. On any given day, it was not unusual for every child in the class to have at least one sighting or use of a target word to report. The children had a great variety of sources for their words, such as television shows involving "accomplices," food packages touting their contents as "wholesome" or "nutritious," lunchroom and playground talk about who was a "glutton" and who was a "tyrant," and conversations from home about being "famished" for dinner and getting "impatient."

The journal the teacher kept about daily vocabulary lessons and events gives more testimony to the children's awareness and use of the target words. One incident was reported in which the children were attending a school assembly program when a speaker happened to use one of the target words; a general buzz of recognition was heard among the experimental group children! Similar situations arose in classes such as music or art in which a teacher's unwitting use of a target word caused a brief stir within the class.

The teacher's journal also gives instances of the children's use of the words in their written work. Part of this group's daily classroom assignment, independent of the vocabulary program, was to make an entry in a personal journal. One sample from a child's journal read: "Someday I will be able to embrace my lover. Someday I will be able to beckon to my children. Someday [I will] watch them hurl snowballs." About halfway through the program the teacher noted, "More and more the children are using the words in their journals."

Our observations gave us further clues on the usefulness of the words. We noted children using words from previous cycles in class discussions of the present target words. For example, one child described a newly presented word, meander, as a placid activity.

In view of the outcomes of formal measures, the children's responses to questionnaire items, and the preponderance of anecdotal evidence, it seems that the claim can be easily made that the children learned and found use for the words presented in the vocabulary program.

Attitude Toward the Program

Another consideration in reviewing the effects of our instructional program is the attitude of the students toward the instruction. It seems that learning did take place, but did the learners take pleasure and satisfaction from their learning as well? Again it seems that the evidence is clearly positive. First, responses to the questionnaire reveal the children's appreciation of the program. When asked how much they liked learning new words in vocabulary class, 16 responded very much, 7 said pretty much, 3 said only a little bit, and no one answered not at all. A question asking the children the best method of learning new words drew the following response: 17 said by having a vocabulary program like the one this year; 5 said by having the teacher tell them the words before a reading lesson; 2 responded by looking up the words in a dictionary and using them in a sentence, and 2 said by using a language arts schoolbook.

A positive attitude was also detected through observations by staff members. First of all, when observers arrived in the classroom it was during a mid-morning brief recess, scheduled right before vocabulary class, so children were seen engaging in activities of their own choosing. Time and time again groups of children were involved in some spontaneous activity related to the vocabulary program. They were seen playing charades with target words, duplicating a game from an earlier lesson, or writing up reports to earn Word Wizard points. Within the lessons themselves, a virtually universal enthusiasm was noted in each lesson observed and was

maintained throughout the class period.

The teacher's daily journal makes frequent note of the children's enthusiasm for the program. Comments of "high interest" and "children showed an eagerness to (participate)" appear often in the description of the daily implementation. The teacher also reported ways in which children carried program activities beyond vocabulary class. In one instance the class prepared a play based on a story from one of the lessons. In another case, after a lesson that required children to present skits to the class, the children went on to create their own skits using the target words. Certain types of worksheets also motivated the children to invent their own items. For example, one type of worksheet entitled "Word Lines" asked children to place descriptions of activities or events containing target words along a continuum, such as "how much would you like to...devour a whole chocolate cake?...share a small seat with an obese person?" Children created their own Word Lines, of which the following is an example: "Would you like to...embrace Robert Redford?...kiss an obese glutton who was a virtuoso?...seize $500,000?"

One entry in the teacher's journal shows that the children eagerly anticipated the start of new cycles of words. On the morning before one particular cycle began, the teacher had hung the chart of new words on the bulletin board, with the words facing the wall. All morning children attempted to peek at the chart whenever they were in that area of the room. By the time the lesson began the children were trying to figure out the category of words for the new cycle, and pronouncing some of the new words for the teacher.

All reports of the implementation of the program indicate that the program successfully created an excitement about learning and knowing words. Probably the best summary of the children's attitude toward the program is that students wanted more. The teacher reported to us that when she announced the final lesson, the children expressed disappointment that the program was ending, and wondered why the people who wrote the program couldn't bring them more lessons. Even this fall, when we entered the same school to test the current fourth-graders, children from last year's experimental class approached us to ask if we could create more vocabulary lessons for them this year.

In this section a variety of sources was enlisted to portray various aspects of the program's use in one fourth-grade classroom. There is strong evidence to show that the children did learn the words and found them useful enough to carry into their daily lives. It seems clear, too, that the learning was enjoyed and that an excitement about words was generated. In addition, some results hint that greater learning than that of the specific words taught may have transpired.

Summary and Further Work

In this paper we described the rationale and design of a vocabulary program created as the instrumentation for research exploring the relationship between vocabulary and reading comprehension. We began by examining the vocabulary instruction offered in basal readers and concluded that it is inadequate to teach

new vocabulary in such a way as to enhance students' vocabulary repertoires or influence reading comprehension.

The rationale and theoretical positions underlying our program were then presented. Notable here was the view that, to affect reading comprehension, words must be taught to a level of rapid, virtually automatic, lexical access. Also important in guiding our program development was the notion that instruction designed to effect expertise on a limited set of words might foster a general word consciousness. This heightened word consciousness might then lead to independent learning of words. The reflection of our notions within the instruction was shown through a detailed description of the instructional cycle. Examples of the instructional activities were presented to communicate the flavor of the program.

Finally, we enlisted a variety of sources to demonstrate the effects of the program. The evidence was clear in illustrating that the children exposed to the program learned the words, found them useful additions to their verbal repertoires, and took pleasure from their learning. Results of the program also hinted that a general transfer may have occurred from learning a limited set of words to learning equally difficult but unrelated words.

Throughout this paper we have given indications as to the direction of future work. The results of the experimental tasks we designed and administered to the 1979-1980 experimental and comparison groups will be reported in light of what they reveal about the nature of the relationship of vocabulary development to reading comprehension.

The implementation of the vocabulary program has been increased to one classroom in each of two schools for the 1980-1981 school year, with administration of the same battery of tests to experimental and comparison populations in order to determine whether the findings from the 1979-1980 implementation can be replicated. In pursuit of the roots of "word consciousness," more sophisticated tasks have been designed to try to get at the kind of knowledge structures that develop through intensive vocabulary training. Toward the broader goal of contributing to reading theory and reading practice, the exploration of the relationship between vocabulary and reading comprehension will continue through the further development of our vocabulary program and associated research.

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